Zachary C. Gillihan 2008

TH-10 Thermal Relay

PURPOSE

The TH-10 Thermal Relay provides a simple, adjustable time delay relay for effecting the release of approach or time locking, or for other applications involving time delay, when the time interval required for a complete operating cycle does not exceed the maximum time interval listed in the ordering references herewith. It has a back contact for checking the completion of its cycle.

CHARACTERISTICS

Power consumption: approximately 10 watts.

Energy source: either d-c. or a-c.

Contacts: one front and one back, independent silver to silver.

For timing ranges available, see ordering references.

The TH-10 relay has temperature compensation so as to greatly reduce the changes in the timing cycle which would otherwise occur with changes in ambient temperature. For a variation of 50° F. above or below a nominal room temperature of 70° F., when operated at rated voltage, or for a given temperature with voltage variation of plus or minus 10%, the relay timing will stay within 15% of its original adjustment.

The relay may be externally adjusted within its normal time range by the use of a small screw driver through a post which can then be lead-sealed. Another sealable post provides a shipping lock which can be engaged with the movable element for protection during transportation.

Although it is recommended that the heater coil be energized for only the rated front contact periods of time, the coil is physically capable of being energized continuously at rated voltage without appreciable change in thermal characteristics.

MOUNTING

The relay should be mounted vertically.

COVER

The relay is enclosed by a glass cover and sealed against dust and moisture.

CIRCUIT APPLICATION

While the following diagrams illustrate only two typical applications of the Union Style TH-10 Thermal Relay, this relay may be used in a number of signaling schemes where a time-delay relay is required.

The arrangement shown by Fig. 1 provides a long release time using the Complete Operating Cycle of a Thermal Relay in the release of Approach (or Time) Locking.

When the signal is placed at stop with the approach section occupied, signal repeating relay "RGPR" is picked up by a circuit which checks that the signals are at stop and also includes the checking contact of the thermal relay to insure that the time of a complete operating cycle of the thermal relay must elapse before the approach locking relay "ASR" can pick up. A stick circuit then holds relay "RGPR" picked up while the thermal relay is operating.

Relay "RGPR" picked up closes the heating circuit for thermal relay "TER". At the end of the heating time, the front contact of relay "TER" closes to energize relay "TESR" which in turn opens the heating circuit. A stick circuit holds relay "TESR" energized during the cooling time of thermal relay "TER", and when the checking contact on relay "TER" recloses at the end of this time, approach locking relay "ASR" is picked up to complete the "lock circuit" which permits switch operation. Relay "TESR" is de-energized when relay "ASR" picks up.

The arrangement illustrated by Fig. 2 provides a Short release time using the Front Contact Time only of a Thermal Relay in the release of Time Locking.

When the signal is placed at stop, the signal repeating relay "RGPR" is energized by a circuit which checks that the signals are at stop and includes the checking contact of the thermal relay to insure that the full heating time of thermal relay "TER" must elapse before the time locking relay "ASR" can pick up. A stick circuit then holds relay "RGPR" energized while the thermal relay is operating.

Relay "RGPR" picked up closes the heating circuit of Relay "TER". At the end of the heating time, the front contact of relay "TER" closes to energize relay "ASR" which in turn opens the heating circuit and at the same time completes the "lock circuit" which permits switch operation.

The thermal relay then cools and recloses its checking contact preparatory to the next operation. Should the signal be recleared at any time, relay "RGPR" will be released and must be reenergized through the checking contact of the thermal relay.

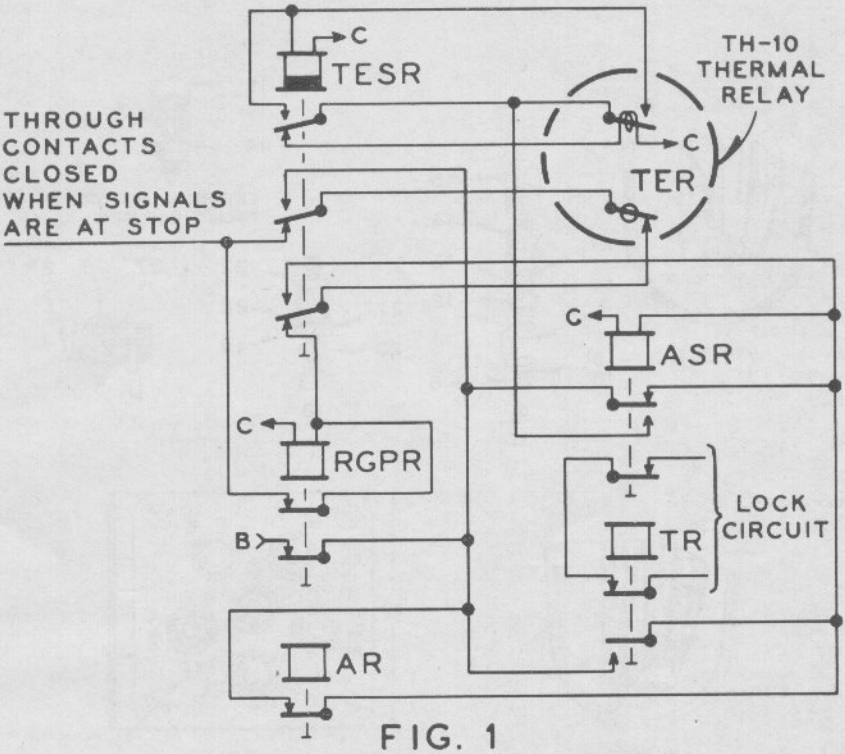

FIG. 1

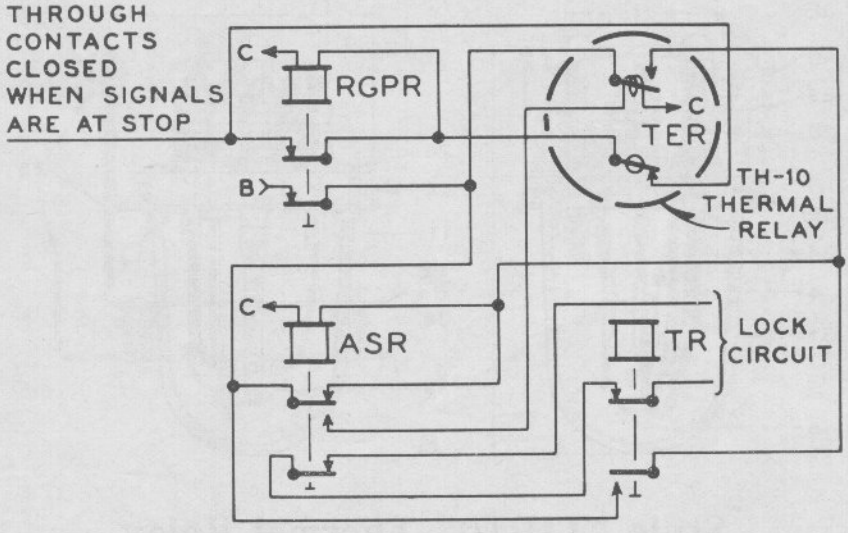

FIG. 2

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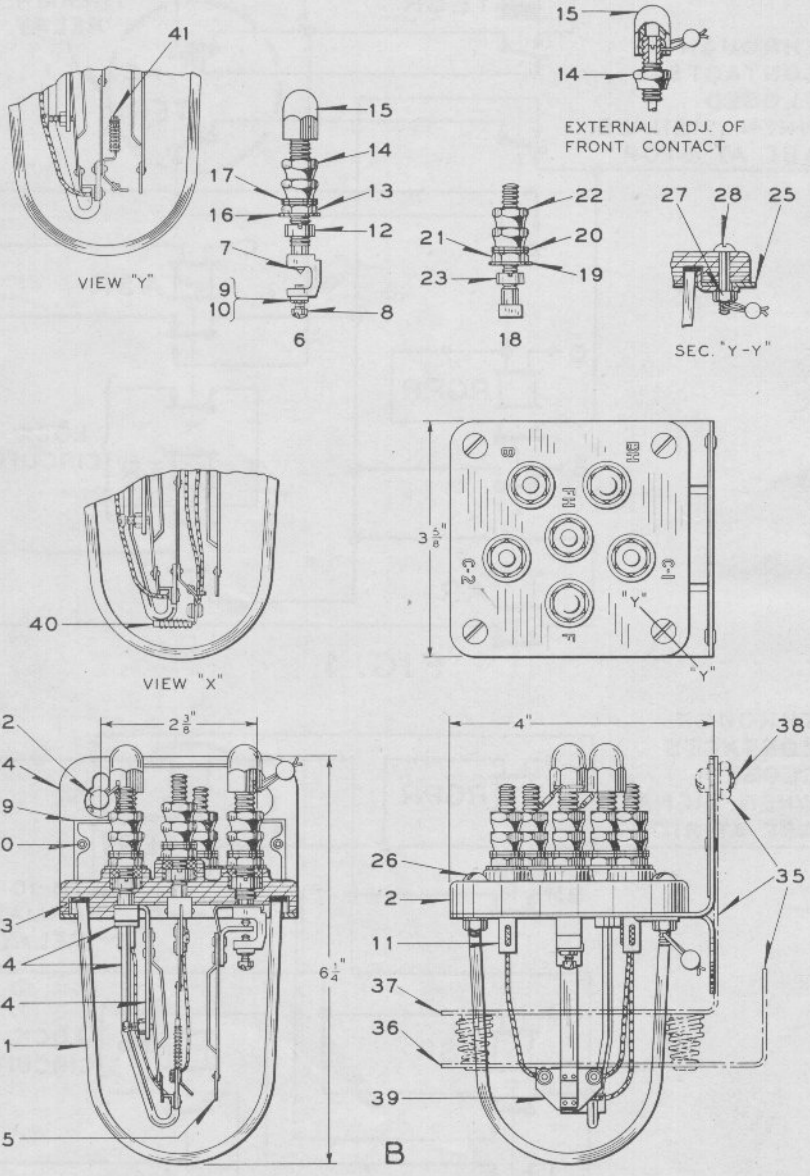

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If operating voltage other than those listed is required, the order should specify the operating voltage if A.C. or number and type of battery cells if D.C. The relay will be shipped adjusted for any specified "Total" operating time within the range shown below for respective assemblies.

If Shock Absorber Ref. 35 is desired, orders should so state.

Order by Plate, Piece, Reference and Abbreviated Description Given in Heavy Face Type Only

Style "TH-10" Thermal Relay Complete, Dwg. B-12662-4

Piece	Ref.	Volts	Ohms Res.	Time Ranges Obtainable with Front Contact Adjustment		Thermal Contact Assembly Ref.
				*Front Contact Time	**Total Operating Time	
183881	**B**	10	10	10″ - 18″	45″ - 70″	39
183882	**Ba**	10	10	10″ - 18″	60″ - 90″	39
183883	**Bb**	10	10	10″ - 18″	80″ - 110″	39
183884	**Bc**	10	10	15″ - 27″	70″ - 100″	39a
183885	**Bd**	10	10	25″ - 35″	110″ - 135″	39b
215673	**Be**	10	10	35″ - 55″	140″ - 185″	40 (Per View "Y")
187707	**Bf**	10	10	60″ - 80″	180″ - 220″	41 (Per View "X")
183967	**Bg**	12	15	10″ - 18″	45″ - 70″	39c
183968	**Bh**	12	15	10″ - 18″	60″ - 90″	39c
183969	**Bj**	12	15	10″ - 18″	80″ - 110″	39c
183970	**Bk**	12	15	15″ - 27″	70″ - 100″	39d
183971	**Bm**	12	15	25″ - 35″	110″ - 135″	39e
234471	**Bn**	12	15	35″ - 55″	140″ - 185″	40a (Per View "Y")
192705	**Bp**	12	15	60″ - 80″	180″ - 220″	41a (Per View "X")

*"Front Contact time" is the time from the instant energy is applied to the heater coil until front contact closes.

**"Total Operating time" or "complete Operating Cycle" is the time from the instant energy is applied to the heater coil until the back contact recloses. This occurs after the action of the thermal element closes the front contact and some relay, thus picked up, opens the heater coil circuit and permits the thermal element to cool and reclose the back contact.

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(Continued)

Order by Plate, Piece, Reference and Abbreviated Description Given in Heavy Face Type Only

Piece	Ref.	Description	Drawing Reference
194923	**2**	**Top Plate**	9968–1113
183519	**4**	**Back Contact Complete**	8385–2359
183541	**5**	**Front Contact Complete**	8385–2360
	6	**Adjusting Terminal Post, Complete** with Sealing Nut, Adjusting Screw, Nuts and Washers (Inc. 1-6a, 1-7, 1-8, 1-12, 1-13, 2-14, 1-15, 1-16 and 2-17)	12451–
183493	**6a**	**Adjusting Terminal Post Only** for Ref. 6	8094–2316
183637	**7**	**Adjusting Screw Only** for Ref. 6	8098–1102
	8	**Machine Screw** No. 6-40x½" Fil. Hd. Br. with Nut Ref. 9 and Nut Lock Ref. 10	12471–
30456	**9**	**Hex. Nut** for Ref. 8	8109–212
134516	**10**	**Nut Lock** for Ref. 8	8486–368
194196	**11**	**Terminal Connector** (Without Flexible Connector)	8244–112
183599	**12**	**Nut** for Ref. 6	8109–383
183600	**13**	**Hex. Nut** for Ref. 6	8109–38
183601	**14**	**Hex. Nut** for Ref. 6	8109–470
183638	**15**	**Sealing Nut** for Ref. 6	8109–471
183598	**16**	**Washer** for Ref. 6	7828–368
183633	**17**	**Washer** for Ref. 6	7828–376
	18	**Terminal Post, Complete** with Nuts and Washers (Inc. 1-18a, 1-19, 2-20, 1-21, 2-22 and 1-23)	12451–
115706	**18a**	**Terminal Post Only,** for Ref. 18	8094–1192
69705	**19**	**Washer Only,** for Ref. 18	7828–287
29102	**20**	**Washer Only,** for Ref. 18	7828–139
29103	**21**	**Hex. Nut Only,** for Ref. 18	8109–194
29101	**22**	**Hex. Nut Only,** for Ref. 18	8109–193

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(Continued)

Order by Plate, Piece, Reference and Abbreviated Description Given in Heavy Face Type Only

Piece	Ref.	Description	Drawing Reference
72948	**23**	**Nut Only,** for Ref. 18	8109–383
183602	**24**	**Bracket**	10914–549
183603	**25**	**Clip**	11893–687
	26	**Machine Screw,** No. 10-30x⅞″ Rd. Hd. Br. (N.P.) with No. 10 S. Lock Washer and Hex. Nut Ref. 27	12471–
26942	**27**	**Hex. Nut** for Refs. 26 and 28	8109–184
	28	**Machine Screw** with hole for sealing and Hex. Nut Ref. 27	12471–
160470	**28a**	**Machine Screw Only** for Ref. 28	8098–919
183639	**29**	**Name Plate**	8225–448
143761	**30**	**Eyelet** for Ref. 29	12579–2
183469	**31**	**Cover Glass**	8163–214
152702	**32**	**Seal** with 2″ of Seal Wire	8988–33
183635	**33**	**Gasket** for Ref. 31	8078–1499
	34	**Shipping Lock and Terminal Post, Complete With** Sealing Nut, Nuts and Washers (Inc. 1-34a, 1-15, 1-12, 1-16, 1-13, 2-17 and 2-14)	12451–
194857	**34a**	**Shipping Lock and Terminal Post Only**	8094–2348
218135	**35**	**Shock Absorber Complete,** with Bracket, Screws and Nuts (Inc. 1-36, 1-37 and 2-38)	12404–41
218125	**36**	**Shock Absorber Mounting Bracket with Springs**	12404–40
218124	**37**	**Bracket** for Shock Absorber	10914–1133
	38	**Screw** Ref. 38a with Nut Ref. 21 and ¼″ S. Lock Washer	12471–
58519	**38a**	**Screw Only**	8098–477